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EXAMINER	
SWICKHAMER, CHRISTOPHER M	
ART UNIT	**PAPER NUMBER**
2662	10

DATE MAILED: 12/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/539,795	GROW ET AL.	
	Examiner	Art Unit	
	Christopher M Swickhamer	2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the Amendment filed 09/05/03. Amended Claims 1-33 have been entered. Claims 1-33 are pending. The Examiner approves the changes to the drawings and specification. Currently claims 1-33 are pending. No claims are in condition for allowance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-8, 11-19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Charny et al (USP 6,072,772, hereafter Charny) in view of Cloonan et al (USP 5,724,32, hereafter Cloonan).

- Referring to claims 1 and 12, Charny discloses a switching fabric for transmitting data frames to destinations, each data frame having a destination, the switching fabric comprising: a plurality of input ports for partitioning portions of received data frames to provide data cells (col. 6, lns. 18-25); and a crossbar switch (plurality of crossbar sections), the crossbar switch (each of the crossbar sections) being coupled to each of the input ports for receiving the data cells at cell transfer intervals on a data link coupled between each of the input ports and the crossbar switch (each of the crossbar sections (Fig. 1), the crossbar switch (each of the crossbar sections) being

coupled to transmit the data cells to any one of a plurality of output ports, wherein each of the input ports includes logic for scheduling the transmission of each data cell of each said data frame received at each of the input ports during a cell transfer interval for each data link coupled between each of the input ports (col. 6, lns. 65-col. 7, lns. 25) and the crossbar switch (each of the crossbar sections) based upon an (ability) availability of the path through the crossbar switch (each of the crossbar sections) to receive the data cells of the data frames with a destination associated with each of the output ports (col. 7, lns. 1-25). Charny does not expressly disclose a crossbar switch with multiple crossbar sections. Cloonan discloses a system that has multiple crossbar sections called pipes. The inputs to the pipes connect each of the input interfaces with each of the output ports. The switch has a controller that finds an available pipe through the switch fabric to the appropriate output port (Fig. 2-4, coll. 7, lns. 5-25, col. 7, lns. 50-60, col. 8, lns. 1-9). The system of Charny could be modified to include a crossbar switch that is broken up into multiple crossbar sections. The controller would be responsible to distribute the traffic across the different pipes in the switch. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system of Charny, with a switch fabric that is divided into different crossbar sections. One of ordinary skill in the art would have been motivated to do this since as the size of the crossbar switch grows, it becomes highly impractical to make an NxN switch when the size of N exceeds 32 (col. 7, lns. 5-15, Cloonan).

- Referring to claims 2 and 13, Charny and Cloonan disclose the switching fabric of claims 1 and 12, wherein each of the input ports maintains a plurality of data frame queues of received data frames, each of the data frame queues corresponding with one of the output ports

and having logic for enqueuing data frames having a destination associated with the output port (col. 6, lns. 54-65).

- Referring to claim 3, Charny discloses the switching fabric of claim 2, wherein each said data frames includes a data payload and each of the input ports provides for each said data frame, one or more associated data cells including a portion of the data payload, the one or more associated data cells collectively having the data payload of each of the data frames, wherein each of the input ports schedules a transmission of each said data cell to one of the crossbar sections on the data link coupled between each of the input ports and each of the crossbar sections (col. 6, lns. 10-35, col. 6, lns. 65-col. 7, lns. 25).

- Referring to claim 4, Charny and Cloonan disclose the switching fabric of claim 3, wherein each of the input ports schedules a transmission of each said data cell to one of the crossbar sections on the data link coupled between each of the input ports and each of the crossbar sections (col. 6, lns. 45-67).

- Referring to claim 5, Charny and Cloonan disclose the switching fabric of claim 3, wherein for each data link coupled between each of the input ports and each of the crossbar sections, each of the input ports attempts to schedule a data cell of a partially transmitted data frame, the partially transmitted data frame having at least one associated data cell previously scheduled for transmission to a crossbar section, prior to scheduling a transmission of a data cell of a data frame for which no data cells have been previously scheduled for transmission to a the crossbar section (the cells are given timestamps, so the fragmented cells would be transmitted before newly arriving cells, col.7, lns. 25-35).

- Referring to claim 6, Charny and Cloonan disclose the switching fabric of claim 1, wherein each of the crossbar sections maintains a plurality of data cell queues of data cells received on the data links coupling each of the crossbar sections to each of the input ports, each of the data cell queues corresponding with an output port, each of the data cells in each of the data cell queues being of a partition of a portion of a data frame having a destination associated with the output port (col. 7, lns. 25-33).

- Referring to claim 7, Charny and Cloonan disclose the switching fabric of claim 6, wherein each of the data cell queues of a the crossbar section is capable of enqueuing a finite number of data cells at any one time, and wherein the ability of the crossbar section to receive the data cells of the data frames with a destination associated with the output port is based upon a quantity of locations in each of the data cell queues which are capable of receiving a single data cell from an input port (col. 7, lns. 55-65).

- Referring to claim 8, Charny and Cloonan disclose the switching fabric of claim 1, the switching fabric further including a plurality of output ports, each output port having logic for reassembling data frames having a destination associated with the each said output port from data cells received from each of the crossbar sections coupled to the each said output port (vol. 6, lns. 40-53).

- Referring to claim 11, Charny and Cloonan disclose the switching fabric of claim 1, wherein the switching fabric includes a plurality of output ports and for each of the output ports, each of the crossbar sections transmits a signal to each of the input ports indicating the ability of each of the crossbar sections to receive the data cells of the data frames having a destination associated with the output port (see claim 1, the controller monitors the paths through the pipes,

so the different sections communicate with the controller, which in turn communicates with the input ports to transmit data).

- Referring to claim 14, Charny and Cloonan disclose the method of claim 13, wherein each of the data frames includes a data payload, the method further comprising: providing for each data frame in a data frame queue at an input port one or more associated data cells including a portion of the data payload of the each said data frame, the one or more associated data cells with the data frame collectively having the data payload of each said data frame; and scheduling a transmission of the one or more associated data cells to one of the crossbar sections on the data link coupled between the input port and the one of the crossbar sections (col. 6, lns. 15-25).

- Referring to claim 15, Charny and Cloonan disclose the method of claim 14, the method further comprising scheduling a transmission of each the one or more associated data cells to the one of the crossbar sections on the data link coupled between the input port and the one of the crossbar sections prior to scheduling a transmission of a data cell of a subsequent data frame in the data frame queue to any of the crossbar sections (the cells have time stamps, col. 7, lns. 25-33).

- Referring to claim 16, Charny and Cloonan disclose the method of claim 15, the method further comprising, for each data link coupled between each input port and each crossbar section, attempting to schedule a transmission of a data cell of a partially transmitted data frame, the partially transmitted data frame having at least one associated data cell previously scheduled for transmission to a crossbar section prior to scheduling a transmission of a data cell of a data frame for which no data cells have been previously scheduled for transmission to the crossbar section

(the cells have time stamps that make sure cells input at an earlier time are output first (col. 7, lns. 25-35).

- Referring to claim 17, Charny and Cloonan disclose the method of claim 12, the method further comprising, at each of the crossbar sections, maintaining a plurality of data cell queues of data cells received on the data links coupling each of the crossbar sections to each of the input ports, each of the data cell queues corresponding with an output port, each of the data cells in each of the data cell queues being of a partition of a portion of a data frame having a destination associated with the output port (col. 6, lns. 15-25).

- Referring to claim 18, Charny and Cloonan disclose the method of claim 17, wherein each of the data cell queues of a crossbar section is capable of enqueuing a finite number of data cells at any one time, the method further including determining the ability of the crossbar section to receive the data cells of the data frames with a destination associated with as the output port based upon a quantity of locations in each of the data cell queues which are capable of receiving a single data cell from an input port (col. 7, lns. 55-65).

- Referring to claim 19, Charny and Cloonan disclose the method of claim 12, the method further comprising: receiving data cells at each of a the plurality of output ports from each of the crossbar sections coupled to the output ports; and at each output port, reassembling data frames having a destination associated with the each said output port from data cells received from each of the crossbar sections coupled to each said output port (col. 6, lns. 45-55).

- Referring to claim 21, Charny and Cloonan disclose the method of claim 17, the method further comprising transmitting a signal from each said output ports to each of the crossbar

sections indicating an ability to receive data cells from data links coupling the each said output port to each of the crossbar sections (col. 8, lns. 3-25).

- Referring to claim 22, Charny and Cloonan disclose the method of claim 12, the method further comprising transmitting a signal from each of the crossbar sections to each of the input ports indicating the ability of each of the crossbar sections to receive the data cells of the data frames having a destination associated with the output port (see claim 1, the controller monitors the paths through the pipes, so the different sections communicate with the controller, which in turn communicates with the input ports to transmit data).

4. Claims 9, 10, 20 and 23-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Charny and Cloonan, and further in view of Momirov (USP 6,489,209 B1).

- Referring to claim 9, Charny and Cloonan disclose the switching fabric of claim 8, but does not expressly disclose wherein each said output port is coupled to one or more media access control (MAC) devices through a common transmission medium, and wherein for each MAC device coupled to the each said output port, the each said output port maintains an associated MAC queue of reassembled data frames for transmission to the each said MAC device, the destination of each reassembled data frame in the associated MAC queue being associated with the MAC device. Momirov discloses a system that fragments packets that are connected to MAC devices. The packets are sent across a switch core. When packets are received, they are partitioned into fixed sized cells. The input port has address resolution units (ARUs) that received the packets, and use a lookup table to insert routing information into the partitioned cell. The cell can then be transmitted across the switch core (col. 7, lns. 10-25, col. 8, lns. 28-col. 9,

lns. 21). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system of Charny, with MAC devices and look-up tables to forward the partitioned cells across the switch core. One of ordinary skill in the art would have been motivated to do this since MAC devices typically send packets of varying lengths, breaking the packets into fixed length cells allows the data to be efficiently transmitted across the switch. Lookup tables are used to address the fragmented packets to ensure that they are properly reassembled at the output.

- Referring to claim 10, Charny discloses the switching fabric of claim 9, wherein each of the said output ports transmits a signal to each of the crossbar sections indicating an ability to receive the data cells from data links coupling to each said output port to each of the crossbar sections (the system has an arbiter that monitors the input and output ports, col. 7, lns. 25-35, the controller of Cloonan monitors the different pipes to determine a path across the switch fabric, se claim 1).

- Referring to claim 20, Charny discloses the method of claim 19, but does not expressly disclose the method further comprising, at each said output port, maintaining a media access control (MAC) queue of reassembled data frames to be transmitted to one or more MAC devices through a common transmission medium, the destination of each reassembled data frame in the MAC queue being associated with the one or more MAC devices. Momirov discloses a system that fragments packets that are connected to MAC devices. The packets are sent across a switch core. When packets are received, they are partitioned into fixed sized cells. The input port has address resolution units (ARUs) that received the packets, and use a lookup table to insert routing information into the partitioned cell. The cell can then be transmitted across the switch

core. The cells are then reassembled after passing through the switch core (col. 7, lns. 10-25, col. 8, lns. 28-col. 9, lns. 21). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system of Charny, with MAC devices and look-up tables to forward the partitioned cells across the switch core. One of ordinary skill in the art would have been motivated to do this since MAC devices typically send packets of varying lengths, breaking the packets into fixed length cells allows the data to be efficiently transmitted across the switch. Lookup tables are used to address the fragmented packets to ensure that they are properly reassembled at the output.

5. - Referring to claim 23 (items are italicized for clarity to indicate terminology inside the parenthesis), Charny discloses in a data communication network including a plurality of host computers for transmitting data packets to a plurality of destinations, (*each destination being associated with a media access control (MAC) device having a MAC address*), the improvement including: a plurality of output ports (Fig. 1), (*each of the output ports being coupled to at least an associated one of the MAC devices for transmitting MAC data frames to the at least one MAC device according the MAC address associated therewith; a look-up engine for receiving the data packets from the host computers and forming intermediate data frames based upon the data packets*), the (*intermediate*) data frames having information identifying an output port associated with one of the destinations the network device in a header and a data payload (col. 6, lns. 15-25); a plurality of input ports for receiving the (*intermediate*) data frames (*from the lookup engine*), each of input ports partitioning the data payload of at least some of the intermediate frames received at the input port to provide a plurality of data cells (Fig. 1, col. 6, lns. 15-25);

and a crossbar switch (*plurality of crossbar sections*), the crossbar switch (*each of the crossbar sections*) being coupled to each of the input ports for receiving the data cells at cell transfer intervals on a data link coupled between each of the input ports (Fig. 1, col. 7, lns. 55-65) and the crossbar section (*each of the crossbar sections*), to the crossbar switch (*each of the crossbar sec*tions) being coupled to transmit the data cells to any one of the plurality of output ports (col. 6, lns. 65-col. 7, lns 25), wherein each of the input ports includes logic for scheduling the transmission of each data cell of each intermediate data frame received at the each of the input ports during a cell transfer interval for each data link coupled between each of the input ports and the crossbar switch (*each of the crossbar sections*) based upon an ability of the crossbar switch (*each of the crossbar sections*) to receive data cells of data frames associated with the output port (col. 6, lns. 65-col. 7, lns.25).

Charny does not expressly disclose a crossbar switch with multiple crossbar sections. Cloonan discloses a system that has multiple crossbar sections called pipes. The inputs to the pipes connect each of the input interfaces with each of the output ports. The switch has a controller that finds an available pipe through the switch fabric to the appropriate output port (Fig. 2-4, coll. 7, lns. 5-25, col. 7, lns. 50-60, col. 8, lns. 1-9). The system of Charny could be modified to include a crossbar switch that is broken up into multiple crossbar sections. The controller would be responsible to distribute the traffic across the different pipes in the switch. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system of Charny, with a switch fabric that is divided into different crossbar sections. One of ordinary skill in the art would have been motivated to do this since as the size

of the crossbar switch grows, it becomes highly impractical to make an NxN switch when the size of N exceeds 32 (col. 7, lns. 5-15, Cloonan).

Charny does not expressly disclose that the output ports are coupled to MAC devices with MAC addresses, where a lookup engine forms intermediate frames specifying an output port associated with a destination. Momirov discloses a system where MAC devices are attached to a switch core. When packets are received, they are partitioned into fixed sized cells. The input port has address resolution units (ARUs) that received the packets, and use a lookup table to insert routing information into the partitioned cell. The cell can then be transmitted across the switch core (col. 7, lns. 10-25, col. 8, lns. 28-col. 9, lns. 21). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the system of Charny, with MAC devices and look-up tables to forward the partitioned cells across the switch core. One of ordinary skill in the art would have been motivated to do this since MAC devices typically send packets of varying lengths, breaking the packets into fixed length cells allows the data to be efficiently transmitted across the switch. Lookup tables are used to address the fragmented packets to ensure that they are properly reassembled at the output.

- Referring to claim 24, Charny discloses the data communication network of claim 23, wherein each of the input ports maintains a plurality of data frame queues of received intermediate data frames, each of the data frame queues corresponding with one of the output ports and enqueuing intermediate data frames having a destination associated with the output port (col. 6, lns. 54-65).

- Referring to claim 25, Charny discloses the data communication network of claim 24, wherein each of the intermediate data frames includes a data payload and each of the input ports

provides for each data frame one or more associated data cells including a portion of the data payload, the one or more associated data cells with the data frame collectively having the data payload of the intermediate data frame, wherein each of the input ports schedules a transmission of each of the one or more associated data cells to one of the crossbar sections on the data link coupled between each of the input ports and each of the crossbar sections (col. 6, lns. 15-25).

- Referring to claim 26, Charny discloses the data communication network of claim 25, wherein each of the input ports schedules a transmission of each the one or more associated data cells to one of the crossbar sections on the data link coupled between each of the input ports and each of the crossbar sections prior to scheduling a transmission of a data cell of a subsequent data frame in the data frame queue to any of the crossbar sections (the cells have time stamps to make sure cells are transmitted in an appropriate order, col. 7, lns. 25-35).

- Referring to claim 27, Charny discloses the data communication network of claim 25, wherein for each data link coupled between each of the input ports and each of the crossbar sections, each of the input ports attempts to schedule a data cell of a partially transmitted data frame, the partially transmitted data frame having at least one associated data cell previously scheduled for transmission to a crossbar section prior to scheduling a transmission of a data cell of a data frame for which no data cells have been previously scheduled for transmission to the crossbar section (the cells have time stamps to make sure cells are transmitted in an appropriate order, col. 7, lns. 25-35).

- Referring to claim 28, Charny discloses the data communication network of claim 23, wherein each of the crossbar sections maintains a plurality of data cell queues of the data cells received on the data links coupling each of the crossbar sections to each of the input ports, each

of the data cell queues corresponding with an output port, each of the data cells in each of the data cell queues being of a partition of a portion of a data frame having a destination associated with the output port (col. 7, lns. 25-35).

- Referring to claim 29, Charny discloses the data communication network of claim 28, wherein each of the data cell queues of the crossbar sections is capable of enqueuing a finite number of data cells at any one time, and wherein the ability of each of the crossbar sections to receive the data cells of the data frames with a destination associated with as the output port is based upon a quantity of locations in each of the data cell queues which are capable of receiving a single data cell from an input port (col. 7, lns. 55-65).

- Referring to claim 30, Charny discloses the data communication network of claim 23, wherein each of the output ports includes logic for reassembling the data frames having a destination associated with each of the output ports from data cells received from each of the crossbar sections coupled to each of the output ports (col. 6, lns. 45-55).

- Referring to claim 31, Charny discloses the data communication network of claim 30, wherein each of the output ports is coupled to each MAC device associated with each of the output ports through a common transmission medium and wherein each of the output ports maintains a MAC queue of reassembled data frames for transmission to the associated MAC devices, the destination of each reassembled data frame in the MAC queue being associated with the MAC device (see claim 23, col. 8, lns. 3-15).

- Referring to claim 32, Charny discloses the data communications network of claim 31, wherein each of the output ports transmits a signal to each of the crossbar sections indicating an

ability to receive the data cells from data links coupling each of the output ports to the each of the crossbar sections (col. 8, lns. 3-40).

- Referring to claim 33, Charny discloses the data communication network of claim 23, wherein for each of the output ports, each of the crossbar sections transmits a signal to each of the input ports indicating the ability of each of the crossbar sections to receive the data cells of the data frames having a destination associated with each of the output ports (see claim 23, the pipes have a controller that monitors the different pipes and their ability to receive data associated with an output port).

Response to Arguments

6. Applicant's arguments with respect to claims 1-33 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M Swickhamer whose telephone number is (703) 306.4820. The examiner can normally be reached on 8:00-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (703) 305-4744. The fax phone number for the organization where this application or proceeding is assigned is (703) 872.9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305.3900.

CMS
December 11, 2003

HASSAN KIZOU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600